ME345: Automation & Manufacturing Methods
Fall 2018

Instructor and Class Information

Instructor: Peter A. Zink, pzink@bu.edu, (617)358-1631
Office Hours: Thursdays 1-3pm or by appointment, check http://bit.ly/1GTfzfj for availability,
Office Location: 730 Commonwealth Ave, EMA 209
Lecture Times, Location: Mon 2:30-4:05 & Wed 2:30-4:05, EMB 105
Graduate Teaching Assistant: Anastasia Gkousioudi, agkousio@bu.edu
Lab Supervisor: Ryan Lacy, lacyr@bu.edu, (617)353-4274
Lab location, Hours: 750 Comm Ave, See EPIC Website for hours
Prerequisites: None
Course Website: `http://learn.bu.edu` & Twitter feed: `https://twitter.com/profpzink`

Course Description:

An introduction to the major concepts and practices of modern manufacturing, including computer numerically controlled (CNC) machine programming, factory physics, robotic programming and control, real-time process control, digital imaging and machine vision, programmable logic control (PLC), statistical process control (SPC), production system design (LEAN), and computer-based process simulation. Strong emphasis is given to hands-on laboratory experience, with a lecture component covering fundamental concepts and supporting the laboratory exercises and projects. Includes lab. 4 credits.

Course Objectives

1. Introduce principles, methods, and tools used in modern manufacturing.
2. Acquire practical experience in computer-aided manufacturing (CAM) and manufacturing process development through a series of laboratory exercises.
3. Understand the strategies and methods used to optimize production system design & operations.
4. Support a team effort to design & manufacture a product with the ADML flexible manufacturing cell.

Required Reading

- *The Goal:*, E. M. Goldratt, North River Press, 3rd Edition (2004) or newer.
- *Other readings (articles, excerpted material, etc) posted to Blackboard*

Grading:

1. Labs (pre-lab questions 25%, lab reports 75%): [30%] (Lowest pre-lab grade will be dropped)
2. Homework [20%] (Weighted equally)
3. Mid-term Exam* [20%] (Based on lectures, exercises, homework, discussions, labs, reading, etc.)
4. Course Project (based on level of effort, presentation and reports) [20%]
5. Class & Lab Attendance, in-class exercises, team feedback, quizzes and participation [10%]

Labs:

- All labs will take place in the EPIC ADML facility (EPC 101, 750 Comm Ave).
- In order to access that facility, you must take and pass the EPIC Safety quiz: http://www.bu.edu/eng/current-students/epic/safety/.
- Students must hand in their **individual** pre-lab answers at the beginning the lab exercises to the lab supervisor.
- Students will work in teams of two, a single lab report is written by each group of two, and handed to the lab supervisor one week after their lab session.

Table 1: ME345 Lab Schedule; labs on the same row are conducted in parallel (groups A and B switch the following week)

Lab#	Title	Lab#	Title
1	Applied Design for Manufacturing		
2	Applying CAM to a CNC Mill	3	Applying CAM to a CNC Lathe
4a	Collaborative Industrial Robotics Part I		
4b	Collaborative Industrial Robotics Part II		
5	Statistical Process Control		
	RC Car Project Prototype Build		
6	Advanced Robotics & Hardware Systems Integration		
7	Vision Systems	8	Programmable Logic Control
9	Computer Integrated Manufacturing, Part I		
10	Computer Integrated Manufacturing, Part II		
11	Computer Integrated Manufacturing, Part III		

Course Project:

The course project entails the manufacture of a product using the flexible manufacturing cell in the ADML. This project includes: design of the product and its parts, development of manufacturing strategy and processes, CIM control, scheduling and cost estimation. Your lab group of 4 (both groups that meet during your lab time) is your final project group.

Each team will design, manufacture, and race small RC cars. Each team must provide at least one complete, working, assembled car for racing purposes, and a TBD number of cars during the final manufacturing session. The (4) students in each weekly lab period comprise a team. Each team will compete using their own car on a race course to test the success of their team's design. A written project proposal and final report are written as a team.

General Class Policies

- Make up of missed work permitted only with approval **before** the scheduled due date/time.
- It is the student's responsibility to ensure sure that all quizzes and assignments have been recorded correctly. After two weeks after an assignment is returned there is no change in grade.
- Non-engineering cell phone use in lab and class is prohibited; repeat offenses will result in a grade penalty.
- Students must follow the BU Academic Conduct Code: `http://www.bu.edu/academics/files/2011/08/AcademicConductCode.pdf`. Any violation of this conduct code will be reported to the College of Engineering Academic Conduct Committee. This includes plagiarism, defined by Merriam-Webster as: ?to steal and pass off (the ideas or words of another) as one?s own?. Students should take care to cite any source they use and ensure anything they hand in as their own is their own original work.